IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Yasuhiro YOSHIOKA — Group Art Unit: 1752

Application No.: 10/622,668 — Examiner: Thorl Chea

Filed: July 21, 2003

For: PHOTOTHERMOGRAPHIC MATERIAL

DECLARATION UNDER 37 C.F.R. §1.132

Honorable Commissioner of Patents and Trademarks

P.O. Box 1450, Alexandria, Virginia 22313-1450

Sir:

I, Yasuhiro YOSHIOKA, do declare and state as follows:

I received a Master's Degree in Chemistry from the Graduate School of The University of Tokyo in March 1980;

I joined Fuji Photo Film Co., Ltd. (now FUJIFILM Corporation) in April 1980, and was engaged in the research of state analysis and reaction analysis of organic materials for silver halide photography from April 1980 to 1989, and in the research of raw materials for silver halide color photographic photosensitive materials and in the research and development of designing of silver

halide color photographic photosensitive materials from 1990 to 1998, and have been engaged in the research of raw materials for silver halide photothermographic photosensitive materials and in the research and development of designing of silver halide photothermographic photosensitive materials from 1999 to present; and

I am familiar with the Office Action of October 9, 2007, and understand that the Examiner has rejected Claims 1, 5, 7, 9, 11, and 13 to 19 under 35 U.S.C. §103(a) as being unpatentable over European Patent No. 1096310 (hereinafter abbreviated as "EP '310") and Oya et al. (U.S. Patent Application No. 2001/0051319 A1).

The following additional comparative experiment was carried out under my supervision in order to make the advantages of the subject matter disclosed and claimed in the above-identified application more clear.

Experiment:

Samples 020' to 026, 030 to 036, 040 to 046, 050 to 056, and 060 to 066 were prepared in the same manner as Sample 008 of Example 1 shown in the specification of the present application, except that the species of the two reducing agents used in Sample 008 and coating amounts

thereof were changed to those shown in the following Tables A' and B. The reducing agents of formula (R1) contained in Samples 020' to 026, 030 to 036, and 040 to 046 were the same (I-6), while the reducing agents of formula (R2) contained therein were varied to I-4, I-9 or I-13. The reducing agents of formula (R2) contained in Samples 050 to 056, and 060 to 066 were the same (I-4), while the reducing agents of formula (R1) contained therein were varied to R1-1 or R1-3 shown in the specification of the present application.

Each of Samples 070, 071, 072, 073, 074, 075, and 076 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the photosensitive silver halide used in Samples 020' to 026 was changed to that contained in the photosensitive silver halide-containing emulsion "AG-2" as shown in the following Table C.

Each of Samples 080, 081, 082, 083, 084, 085, and 086 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the photosensitive silver halide used in Samples 020' to 026 was changed to that contained in the photosensitive silver halide-containing emulsion "AG-3" as shown in the following Table C.

Each of Samples 090, 091, 092, 093, 094, 095, and 096

were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the binder used in Samples 020' to 026 was changed to the binder "S-2" as shown in the following Table D.

Each of Samples 100, 101, 102, 103, 104, 105, and 106 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the binder used in Samples 020' to 026 was changed to the binder "S-3" as shown in the following Table D.

Each of Samples 110, 111, 112, 113, 114, 115, and 116 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the non-photosensitive organic silver salt (fatty acid silver salt) used in Samples 020' to 026 was changed to that contained in the non-photosensitive organic silver salt dispersion "B-2" as shown in the following Table E.

Each of Samples 120, 121, 122, 123, 124, 125, and 126 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the non-photosensitive organic silver salt (fatty acid silver salt) used in Samples 020' to 026 was changed to that contained in the non-photosensitive

organic silver salt dispersion "B-3" as shown in the following Table E.

Further, each of Samples 130, 131, 132, 133, 134, 135, and 136 were prepared in the same manner as Samples 020', 021, 022, 023, 024, 025, or 026 respectively, except that the species of the phthalazine compound used in Samples 020' to 026 was changed to the phthalazine compound "F-2" as shown in the following Table F.

The photosensitive silver halide-containing emulsion "AG-1" was the same as the mixed emulsion A for coating solution used in Sample 008 of Example 1 shown in the specification of the present application, and was formed by mixing: 70% by weight of the silver halide emulsion 1 containing a silver bromide iodide particle containing 3.5% by mol iodine uniformly and having an average sphere-equivalent diameter of 0.042 μm; 15% by weight of the silver halide emulsion 2 containing a pure silver bromide cubic particle having an average sphere-equivalent diameter of 0.080 μm; and 15% by weight of the silver halide emulsion 3 containing the silver bromide iodide particle containing 3.5% by mol of iodine and having an average sphere-equivalent diameter of 0.034 μm. The photosensitive silver halide-containing emulsion "AG-2" was formed by mixing: 85% by weight of a silver halide emulsion 4 containing a silver bromide iodide particle

containing 4.0% by mol iodine uniformly and having an average sphere-equivalent diameter of 0.036 µm; and 15% by weight of the silver halide emulsion 2 containing a pure silver bromide cubic particle having an average sphere-equivalent diameter of 0.080 µm. Further, the photosensitive silver halide-containing emulsion "AG-3" was formed by mixing: 85% by weight of a silver halide emulsion 5 containing a silver bromide iodide particle containing 2.5% by mol iodine uniformly and having an average sphere-equivalent diameter of 0.054 µm; and 15% by weight of the silver halide emulsion 2 containing a pure silver bromide cubic particle having an average sphere-equivalent diameter of 0.080 µm.

In this regard, the silver halide emulsion 4 was prepared in the same manner as the silver halide emulsion 1, except that a solution temperature at particle formation was changed from 30 °C to 28 °C, the amount of 15.3 g of the potassium bromide and the amount of 0.8 g of the potassium iodide in the solution B were changed to 15.2 g and 0.9 g respectively, and the amount of 44.2 g of the potassium bromide and the amount of 2.2 g of the potassium iodide in the solution D were changed to 43.9 g and 2.6 g respectively. Further, the silver halide emulsion 5 was prepared in the same manner as the silver halide emulsion 1, except that a solution temperature at

particle formation was changed from 30 °C to 34 °C, the amount of 15.3 g of the potassium bromide and the amount of 0.8 g of the potassium iodide in the solution B were changed to 15.5 g and 0.6 g respectively, and the amount of 44.2 g of the potassium bromide and the amount of 2.2 g of the potassium iodide in the solution D were changed to 44.6 g and 1.6 g respectively.

The binder "S-1" was the same as the SBR latex used in Sample 008 of Example 1 shown in the specification of the present application, consisting of styrene/butadiene/acrylic acid with molar ratio of 68/29/3, and having an average particle diameter of 90 nm and a glass transition temperature (Tg) of 17°C. The binder "S-2" was a SBR latex consisting of styrene/butadiene/acrylic acid with molar ratio of 71/26/3, and having an average particle diameter of 90 nm and a Tg of 24°C. Further, the binder "S-3" was a SIR latex consisting of styrene/isoprene/acrylic acid with molar ratio of 60/37/3, and having an average particle diameter of 90 nm and a Tg of 14°C.

The non-photosensitive organic silver salt dispersion "B-1" was the same as the fatty acid silver dispersion A used in Example 1 shown in the specification of the present application prepared by using a commercially-available behenic acid EDELOR C22-85R (trade name,

manufactured by Henkel (now renamed as Cognis) and was a mixture of lignoceric acid/behenic acid/arachidic acid/stearic acid with molar ratio of 2/88/8/2) and consists of silver lignocerate/silver behenate/silver arachidate/silver stearate with molar ratio of 2/88/8/2. The non-photosensitive organic silver salt dispersion "B-2" was a fatty acid silver salt dispersion consisting of silver arachidate/silver behenate/silver lignocerate with molar ratio of 2/96/2, and was prepared in the same manner as the non-photosensitive organic silver salt dispersion B-1 except that the EDELOR C22-85R was used after being re-crystallized. Further, the non-photosensitive organic silver salt dispersion "B-3" was a fatty acid silver salt dispersion prepared in the same manner as the non-photosensitive organic silver salt dispersion B-1, except that stearic acid and arachidic acid were added to the EDELOR C22-85R to prepare the fatty acid silver salt contained therein. The fatty acid silver salt contained in the non-photosensitive organic silver salt dispersion B-3 consists of silver stearate/silver arachidate/silver behenate with molar ratio of 8/12/80.

The phthalazine compound "F-1" was the same as the phthalazine compound-1 used in Sample 008 of Example 1 shown in the specification of the present application and is 6-isopropylphthalazine. The phthalazine compound "F-

2" was phthalazine added to Samples 130 to 136 so as to be the same molar amount of the phthalazine compound-1 as that contained in Sample 008 of Example 1.

The thus prepared Samples were subjected to thermal developing treatment and evaluated in terms of tone and tone stability in the same manner as for Example 1 shown in the specification of the present application, except that the a* and b* values were measured at points having a concentration of 1.2. The concrete values of a*, b*, and the maximum distance R {root of $((\Delta a^*)^2 + (\Delta b^*)^2)$}) are shown in Tables A' to F.

In addition, the plotted a*b* ordinates are shown in the attached Figures 1 to 3. In Figures 1 to 3, the plotted a*b* ordinates derived from the samples having the same configuration while the contained amount ratio of the reducing agents R1 and R2 being varied are linked with a line. Namely, the a*b* ordinates of Samples 020' to 026 (−•−); Samples 030 to 036 (−▲−); Samples 040 to 046 (−■−); Samples 050 to 056 (−◊−); and Samples 060 to 066 (−∗−) are respectively linked with a line in Figure 1: the a*b* ordinates of Samples 020' to 026 (−•−); Samples 070 to 076 (−▲−); Samples 080 to 086 (−■−); Samples 090 to 096 (−◊−); and Samples 100 to 106 (−∗−) are respectively linked with a line in Figure 2: and the a*b* ordinates of Samples 020' to 026 (−•−); Samples 110 to 116 (−▲−); Samples 120

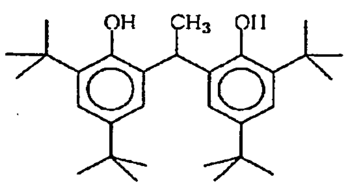
to 126 (-■-); and Samples 130 to 136 (-◊-); are respectively linked with a line in Figure 3.

Ranges of the tone regarded as being preferable or particularly preferable in terms of medical image diagnosis based on the result of a research conducted with image diagnosticians and radiological technicians are also shown in Figures 1 to 3 as the zones enclosed by trapezoids. In the research, each of twenty image diagnosticians and radiological technicians having ten years or more of experience in image diagnosis evaluated twenty test diagnostic images which were prepared by varying compositions to be contained therein and the development conditions such as temperature or time to have the a* values in the range of 0 to -5 and the b* values in the range -4 to -12 to determine if each of the test diagnostic images is preferable or not. I declare that it is believed by those skilled in the art at the time that the present invention was invented that the result of the research sufficiently shows the range of tone which is generally recognized as being preferable by persons skilled in the field of image diagnostics.

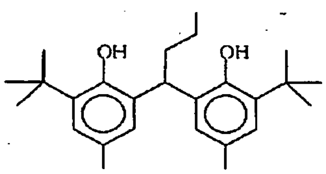
The developing activity of the reducing agent of formula (R2) is judged as being higher than the developing activity of the reducing agent of formula (R1) when the logarithmic value -Log E_2 (E_2: Exposing amount to give a concentration of 1.5 to a

sample using the reducing agent of formula (R2)) is higher than the logarithmic value -Log E_1 (E_1: Exposing amount to give a concentration of 1.5 to a sample using the reducing agent of formula (R1)) by 0.02 or larger.

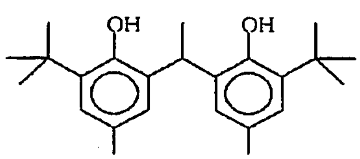
It should be remarked that the reducing agent I-6 shown in EP '310 is within the scope of the reducing agent of formula (R1) of the invention, and the reducing agents I-4, I-9, and I-13 shown in EP '310 are within the scope of the reducing agent of formula (R2) of the invention.



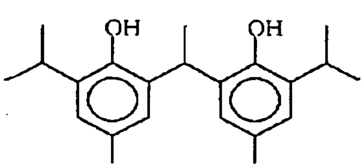
I-6 (corresponding to R1-22 shown in the present application)



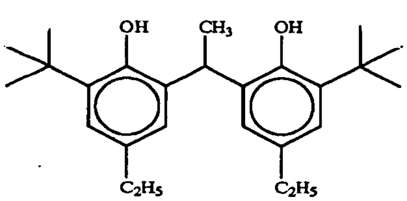
I-4 (corresponding to R2-4 shown in the present application)



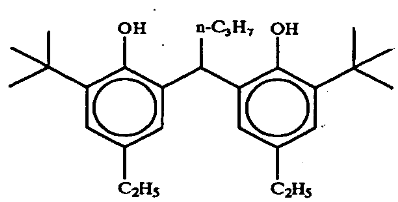
I-9 (corresponding to R2-2 shown in the present application)



I-13



R1-1



R1-3

Table A'

Sample No.	Reducing agent of formula R1		Reducing agent of formula R2		Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
	Species	Coating amount	Species	Coating amount		a*	b*	Organoleptic evaluation	Maximum distance (R =√(Δa*2+ Δb*2))	Organoleptic evaluation	
020'	I-6	100%	I-4	0%	-	-0.5	-10.7	×	2.18	×	Comparative
021	I-6	95%	I-4	5%	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	I-6	90%	I-4	10%	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	I-6	70%	I-4	30%	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	I-6	60%	I-4	40%	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	I-6	50%	I-4	50%	0.15	-2.9	-5	×	2.67	×	Comparative
026	I-6	40%	I-4	60%	0.15	-3.1	-3.5	×	3.52	×	Comparative
030	I-6	100%	I-9	0%	-	-0.5	-10.7	×	2.18	×	Comparative
031	I-6	95%	I-9	5%	0.18	-2	-8.8	◎	0.64	◎	The Invention
032	I-6	90%	I-9	10%	0.18	-2.3	-8.1	◎	0.43	◎	The Invention
033	I-6	70%	I-9	30%	0.18	-2.7	-7.2	○	0.82	○	The Invention
034	I-6	60%	I-9	40%	0.18	-2.9	-6.5	△	0.96	○	The Invention
035	I-6	50%	I-9	50%	0.18	-3.3	-5.2	×	2.15	×	Comparative
036	I-6	40%	I-9	60%	0.18	-3.5	-4	×	3.75	×	Comparative
040	I-6	100%	I-13	0%	-	-0.5	-10.7	×	2.18	×	Comparative
041	I-6	95%	I-13	5%	0.07	-1.2	-9.2	○	1.12	○	The Invention
042	I-6	90%	I-13	10%	0.07	-1.6	-8.2	◎	0.88	◎	The Invention
043	I-6	70%	I-13	30%	0.07	-1.85	-7.5	◎	0.91	◎	The Invention
044	I-6	60%	I-13	40%	0.07	-2	-6.8	○	1.33	○	The Invention
045	I-6	50%	I-13	50%	0.07	-2.15	-6.1	△	2.42	×	Comparative
046	I-6	40%	I-13	60%	0.07	-2.3	-4.9	×	2.96	×	Comparative

Table B

Sample No.	Reducing agent of formula R1		Reducing agent of formula R2		Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
	Species	Coating amount	Species	Coating amount		a*	b*	Organoleptic evaluation	Maximum distance ($R=\sqrt{(\Delta a^{*2}+\Delta b^{*2})}$)	Organoleptic evaluation	
020'	I-6	100%	I-4	0%	-	-0.5	-10.7	×	2.18	×	Comparative
021	I-6	95%	I-4	5%	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	I-6	90%	I-4	10%	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	I-6	70%	I-4	30%	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	I-6	60%	I-4	40%	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	I-6	50%	I-4	50%	0.15	-2.9	-5	×	2.67	×	Comparative
026	I-6	40%	I-4	60%	0.15	-3.1	-3.5	×	3.52	×	Comparative
050	R1-1	100%	I-4	0%	-	-0.8	-10.6	×	2.34	×	Comparative
051	R1-1	95%	I-4	5%	0.13	-1.6	-9.7	△	0.88	◎	The Invention
052	R1-1	90%	I-4	10%	0.13	-2	-9.2	○	0.65	◎	The Invention
053	R1-1	70%	I-4	30%	0.13	-2.4	-8.7	◎	0.82	◎	The Invention
054	R1-1	60%	I-4	40%	0.13	-2.9	-7.9	○	1.36	○	The Invention
055	R1-1	50%	I-4	50%	0.13	-3.35	-6.7	×	2.03	×	Comparative
056	R1-1	40%	I-4	60%	0.13	-3.8	-5.3	×	2.56	×	Comparative
060	R1-3	100%	I-4	0%	-	-0.6	-10.6	×	2.23	×	Comparative
061	R1-3	95%	I-4	5%	0.11	-1.65	-9.8	△	0.83	◎	The Invention
062	R1-3	90%	I-4	10%	0.11	-2.15	-9.35	○	0.66	◎	The Invention
063	R1-3	70%	I-4	30%	0.11	-2.6	-8.9	◎	0.92	◎	The Invention
064	R1-3	60%	I-4	40%	0.11	-2.95	-8.35	○	1.45	○	The Invention
065	R1-3	50%	I-4	50%	0.11	-3.4	-7.3	×	2.15	×	Comparative
066	R1-3	40%	I-4	60%	0.11	-3.8	-6.4	×	2.79	×	Comparative

Table C

Sample No.	Photosensitive silver halide	Binder	Non-photosensitive organic silver salt	Phthalazine compound	Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
						a*	b*	Organoleptic evaluation	Maximum distance (R =√(Δa*2+Δb*2))	Organoleptic evaluation	
020'	AG-1	S-1	B-1	F-1	-	-0.5	-10.7	×	2.18	×	Comparative
021	AG-1	S-1	B-1	F-1	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	AG-1	S-1	B-1	F-1	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	AG-1	S-1	B-1	F-1	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	AG-1	S-1	B-1	F-1	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	AG-1	S-1	B-1	F-1	0.15	-2.9	-5	×	2.67	×	Comparative
026	AG-1	S-1	B-1	F-1	0.15	-3.1	-3.5	×	3.52	×	Comparative
070	AG-2	S-1	B-1	F-1	-	-0.2	-11.1	×	2.38	×	Comparative
071	AG-2	S-1	B-1	F-1	0.15	-1.3	-8.7	○	0.88	◎	The Invention
072	AG-2	S-1	B-1	F-1	0.15	-1.7	-7.7	◎	0.76	◎	The Invention
073	AG-2	S-1	B-1	F-1	0.15	-1.9	-7	◎	0.92	◎	The Invention
074	AG-2	S-1	B-1	F-1	0.15	-2.05	-6.2	△	1.41	○	The Invention
075	AG-2	S-1	B-1	F-1	0.15	-2.3	-5	×	2.75	×	Comparative
076	AG-2	S-1	B-1	F-1	0.15	-2.45	-3.4	×	3.63	×	Comparative
080	AG-3	S-1	B-1	F-1	-	-1.1	-10.5	×	2.63	×	Comparative
081	AG-3	S-1	B-1	F-1	0.15	-2.2	-8.6	◎	1.22	○	The Invention
082	AG-3	S-1	B-1	F-1	0.15	-2.45	-8.1	◎	0.86	◎	The Invention
083	AG-3	S-1	B-1	F-1	0.15	-2.75	-7.3	○	0.88	◎	The Invention
084	AG-3	S-1	B-1	F-1	0.15	-3	-6.5	△	1.27	○	The Invention
085	AG-3	S-1	B-1	F-1	0.15	-3.25	-5.6	×	2.33	×	Comparative
086	AG-3	S-1	B-1	F-1	0.15	-3.45	-4.6	×	2.89	×	Comparative

Table D

Sample No.	Photosensitive silver halide	Binder	Non-photosensitive organic silver salt	Phthalazine compound	Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
						a*	b*	Organoleptic evaluation	Maximum distance (R =√(Δa*²+Δb*²))	Organoleptic evaluation	
020'	AG-1	S-1	B-1	F-1	-	-0.5	-10.7	×	2.18	×	Comparative
021	AG-1	S-1	B-1	F-1	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	AG-1	S-1	B-1	F-1	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	AG-1	S-1	B-1	F-1	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	AG-1	S-1	B-1	F-1	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	AG-1	S-1	B-1	F-1	0.15	-2.9	-5	×	2.67	×	Comparative
026	AG-1	S-1	B-1	F-1	0.15	-3.1	-3.5	×	3.52	×	Comparative
090	AG-1	S-2	B-1	F-1	-	-0.6	-10.8	×	1.97	△	Comparative
091	AG-1	S-2	B-1	F-1	0.15	-1.6	-8.7	◎	0.75	◎	The Invention
092	AG-1	S-2	B-1	F-1	0.15	-1.9	-7.7	◎	0.58	◎	The Invention
093	AG-1	S-2	B-1	F-1	0.15	-2.15	-7	◎	0.88	◎	The Invention
094	AG-1	S-2	B-1	F-1	0.15	-2.3	-6.4	△	1.31	○	The Invention
095	AG-1	S-2	B-1	F-1	0.15	-2.6	-5.2	×	1.89	△	Comparative
096	AG-1	S-2	B-1	F-1	0.15	-2.75	-3.7	×	2.46	×	Comparative
100	AG-1	S-3	B-1	F-1	-	-1.1	-10.9	×	1.88	△	Comparative
101	AG-1	S-3	B-1	F-1	0.15	-1.9	-8.7	◎	0.68	◎	The Invention
102	AG-1	S-3	B-1	F-1	0.15	-2.3	-7.6	◎	0.52	◎	The Invention
103	AG-1	S-3	B-1	F-1	0.15	-2. 5	-6.9	○	0.83	◎	The Invention
104	AG-1	S-3	B-1	F-1	0.15	-2.7	-6.1	△	1.22	○	The Invention
105	AG-1	S-3	B-1	F-1	0.15	-2.925	-5.1	×	1.64	△	Comparative
106	AG-1	S-3	B-1	F-1	0.15	-3.15	-3.6	×	2.38	×	Comparative

Table E

Sample No.	Photosensitive silver halide	Binder	Non-photosensitive organic silver salt	Phthalazine compound	Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
						a*	b*	Organoleptic evaluation	Maximum distance ($R=\sqrt{(\Delta a^{*2}+\Delta b^{*2})}$)	Organoleptic evaluation	
020'	AG-1	S-1	B-1	F-1	-	-0.5	-10.7	×	2.18	×	Comparative
021	AG-1	S-1	B-1	F-1	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	AG-1	S-1	B-1	F-1	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	AG-1	S-1	B-1	F-1	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	AG-1	S-1	B-1	F-1	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	AG-1	S-1	B-1	F-1	0.15	-2.9	-5	×	2.67	×	Comparative
026	AG-1	S-1	B-1	F-1	0.15	-3.1	-3.5	×	3.52	×	Comparative
110	AG-1	S-1	B-2	F-1	-	-0.8	-11.4	×	2.19	×	Comparative
111	AG-1	S-1	B-2	F-1	0.15	-1.8	-9.3	○	0.87	○	The Invention
112	AG-1	S-1	B-2	F-1	0.15	-2.2	-8.2	◎	0.69	◎	The Invention
113	AG-1	S-1	B-2	F-1	0.15	-2.45	-7.5	◎	0.85	◎	The Invention
114	AG-1	S-1	B-2	F-1	0.15	-2.8	-6.3	△	1.33	○	The Invention
115	AG-1	S-1	B-2	F-1	0.15	-3.05	-5.3	×	2.12	×	Comparative
116	AG-1	S-1	B-2	F-1	0.15	-3.3	-4.1	×	2.66	×	Comparative
120	AG-1	S-1	B-3	F-1	-	-0.9	-10.2	×	2.67	×	Comparative
121	AG-1	S-1	B-3	F-1	0.15	-1.7	-8.1	◎	1.18	○	The Invention
122	AG-1	S-1	B-3	F-1	0.15	-1.9	-7.5	◎	0.79	◎	The Invention
123	AG-1	S-1	B-3	F-1	0.15	-2.1	-6.8	○	1.26	○	The Invention
124	AG-1	S-1	B-3	F-1	0.15	-2.3	-6	△	1.68	△	The Invention
125	AG-1	S-1	B-3	F-1	0.15	-2.6	-4.5	×	2.2	×	Comparative
126	AG-1	S-1	B-3	F-1	0.15	-2.9	-2.3	×	2.84	×	Comparative

Table F

Sample No.	Photosensitive silver halide	Binder	Non-photosensitive organic silver salt	Phthalazine compound	Difference in Developing activity of R1 and R2 (R2-R1)	Tone			Tone stability		Remark
						a*	b*	Organoleptic evaluation	Maximum distance ($R=\sqrt{(\Delta a^{*2}+\Delta b^{*2})}$)	Organoleptic evaluation	
020'	AG-1	S-1	B-1	F-1	-	-0.5	-10.7	×	2.18	×	Comparative
021	AG-1	S-1	B-1	F-1	0.15	-1.8	-8.5	◎	0.73	◎	The Invention
022	AG-1	S-1	B-1	F-1	0.15	-2.15	-7.5	◎	0.46	◎	The Invention
023	AG-1	S-1	B-1	F-1	0.15	-2.4	-6.8	○	0.78	◎	The Invention
024	AG-1	S-1	B-1	F-1	0.15	-2.6	-6.2	△	1.42	○	The Invention
025	AG-1	S-1	B-1	F-1	0.15	-2.9	-5	×	2.67	×	Comparative
026	AG-1	S-1	B-1	F-1	0.15	-3.1	-3.5	×	3.52	×	Comparative
130	AG-1	S-1	B-1	F-2	-	-1.9	-10.8	×	2.73	×	Comparative
131	AG-1	S-1	B-1	F-2	0.15	-2.1	-9.7	△	1.64	△	The Invention
132	AG-1	S-1	B-1	F-2	0.15	-2.3	-9.1	○	1.18	○	The Invention
133	AG-1	S-1	B-1	F-2	0.15	-2.6	-8.5	◎	1.23	○	The Invention
134	AG-1	S-1	B-1	F-2	0.15	-3	-7.6	○	1.88	△	The Invention
135	AG-1	S-1	B-1	F-2	0.15	-3.4	-6.8	×	2.68	×	Comparative
136	AG-1	S-1	B-1	F-2	0.15	-4.1	-5.9	×	3.79	×	Comparative

It can be understood from Figures 1 to 3 that the samples of the present invention (namely, samples having the reducing agent of formula (R1) and the reducing agent of formula (R2) in combination and the coating amount of the reducing agent of formula (R2) is 5 mol% to 40 mol% with respect to the total coating amount of the reducing agents) are within the range preferred by image diagnosticians and radiological technicians, while the comparative examples (namely, samples having the reducing agent of formula (R1) and the reducing agent of formula (R2) in combination and the coating amount of the reducing agent of the formula (R2) is 0 mol%, 50 mol% or 60 mol% with respect to the total coating amount of the reducing agents) are outside the preferred range. The results are well consistent with the results of organoleptic evaluations of tone shown in Tables A' to F.

It can be further understood from Tables A' to F that each of the samples of the present invention has a value R of less than 2, while each of the comparative examples has a value R of at least 2. Since a value R of 2 or more indicates unacceptably large degree of tone difference in view of medical image diagnosis as described in the present specification, the values of R of the comparative examples are outside the preferred range. The results are well consistent with the results of organoleptic

evaluations of tone stability shown in Tables A' to F.

The results exhibited by the samples of the present invention are unexpectedly remarkable in terms of tone and tone stability.

As a person skilled in the art to which the present invention pertains, I believe that the results of the present invention indicated above exhibit unexpectedly remarkable results from a technical viewpoint.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATE: April 4, 2008

Yasuhiro Yoshioka

Yasuhiro YOSHIOKA

FIG. 1

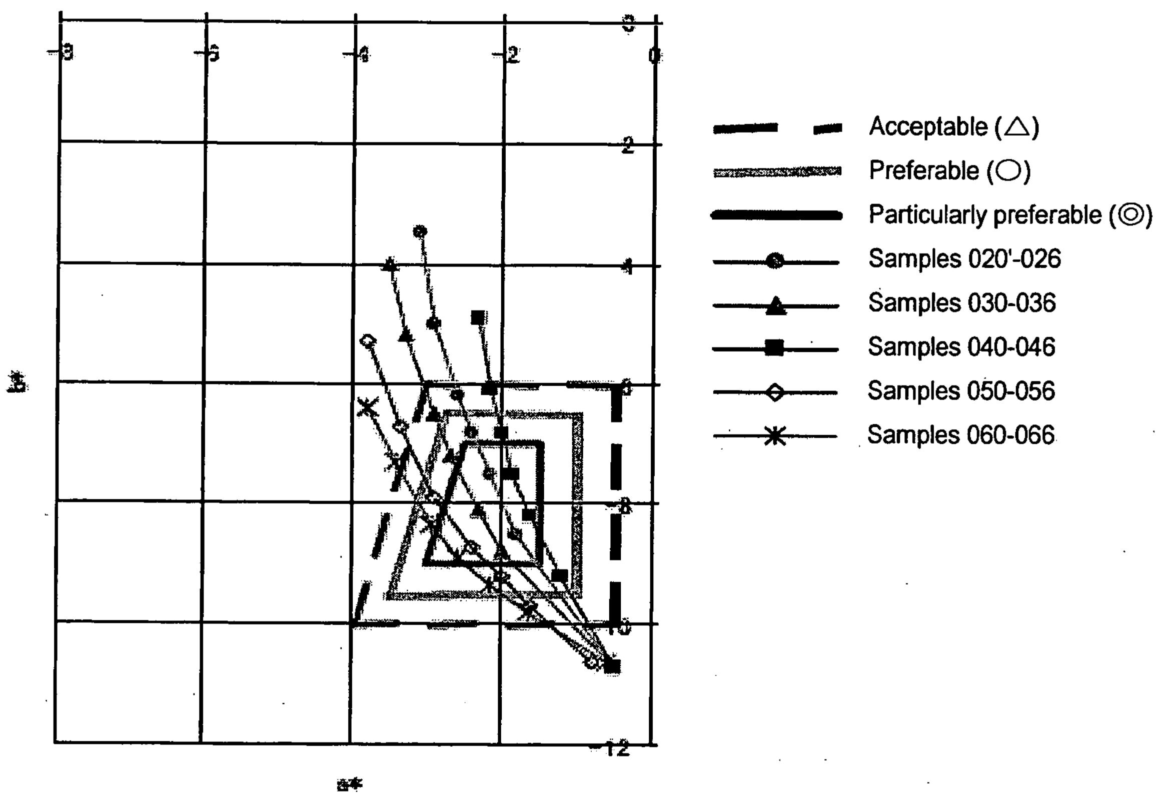
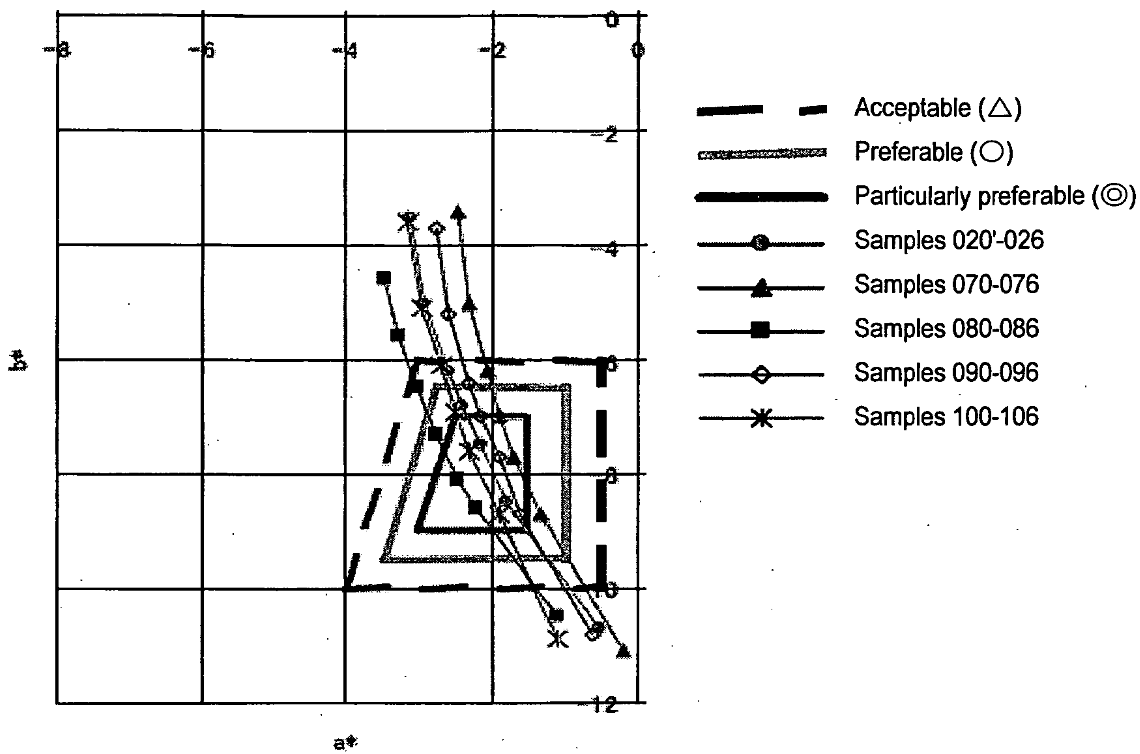
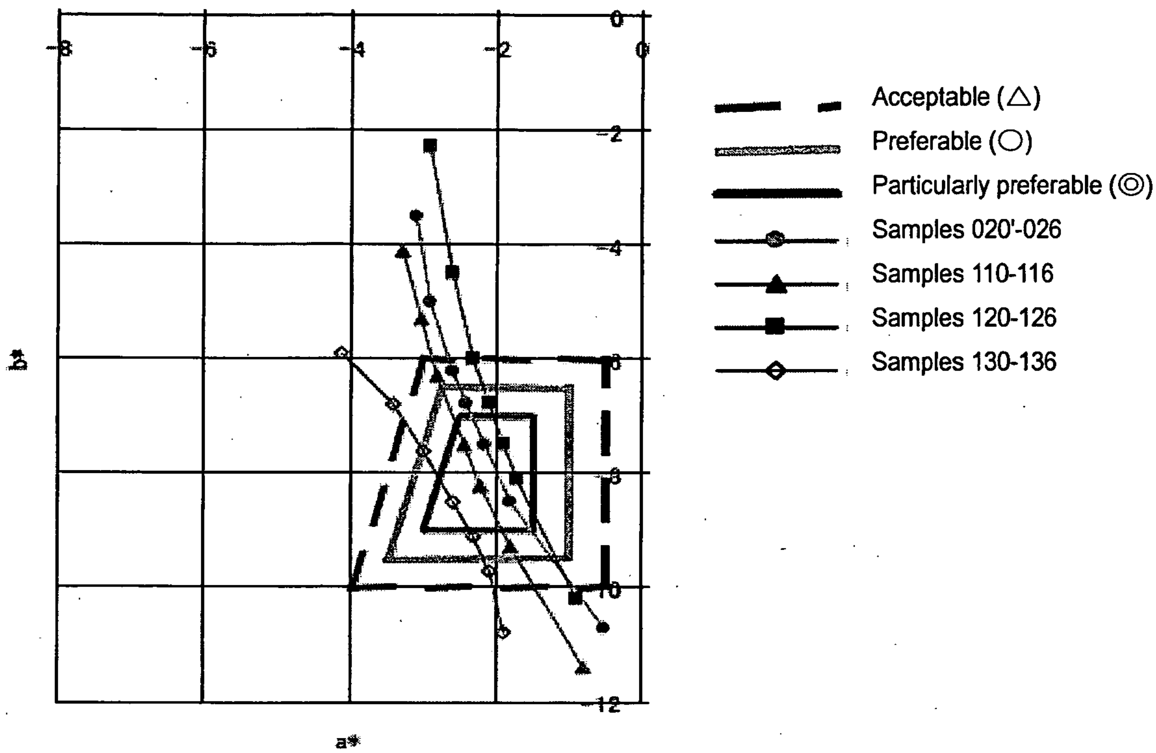

-4
-2
0
2
4
6
8
10
-12
Acceptable (△)
Preferable (○)
Particularly preferable (◎)
Samples 020'-026
Samples 030-036
Samples 040-046
Samples 050-056
Samples 060-066

FIG. 2



0
-8
-6
-4
-2
0
-2
-4
-6
-8
-10
-12
b*
a*
Acceptable (△)
Preferable (○)
Particularly preferable (◎)
Samples 020'-026
Samples 070-076
Samples 080-086
Samples 090-096
Samples 100-106

FIG. 3



0
-8
-6
-4
-2
0
-2
-4
-6
-8
-10
-12
b*
a*
Acceptable (△)
Preferable (○)
Particularly preferable (◎)
Samples 020'-026
Samples 110-116
Samples 120-126
Samples 130-136